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**FC-10 IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Applicant: Jackson et al.

Examiner: WILKINS III., H.D.

Serial No.: 10/601,602

Group Art Unit: 1742

Filing Date: June 23, 2003

For: Low Energy Chlorate Electrolytic Cell and Process

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**REPLY BRIEF UNDER 37 CFR 41.41**

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## **REAL PARTY IN INTEREST**

- 1. Finnchem USA Inc, which is a wholly owned subsidiary of**
- 2. Finnish Chemicals Corporation, which is a wholly owned subsidiary of**
- 3. Finnish Chemicals Oy, Aetsa, Finland, which is a wholly owned subsidiary  
of**
- 4. Kemira Oyj, Helsinki, Finland.**

## **RELATED APPEALS AND INTERFERENCES**

**None**

## **STATUS OF CLAIMS**

**Claims 1 - 7 have been withdrawn**

**Claims 8 - 17, amended in response under Rule 1.111, rejected**

**Claims 18 - 33 have been withdrawn.**

**Claims 34 - 35 added in the response under Rule 1.111, rejected**

## **STATUS OF AMENDMENTS**

- 1. The Amendment under Rule 1.111 has been entered.**
- 2. The Amendment under Rule 1.116 and an Affidavit under Rule 1.132 were denied entry by the Examiner.**
- 3. The Affidavit under Rule 1.132, denied entry by the Examiner, has been entered, according to a decision on a Petition under 37 CFR 1.181 mailed on August 14, 2006.**

## SUMMARY OF CLAIMED SUBJECT MATTER

In the inventive electrolytic cell assembly for the production of an alkali metal chlorate, there is employed a low alkali metal ion transport efficiency (specification, page 13, lines 13 - 20 and page 14, lines 1 - 8) permselective polymer membrane electrolytic cell separator (specification, page 5, lines 15 - 18) between the catalytic, metal anode (specification, page 8, lines 19 - 20) and the catalytic, metal or gas-diffusion cathode of the electrolytic cell (specification, page 5, lines 18 - 20, page 6, lines 1 - 2, page 13, lines 13 - 20, and page 14, lines 1 - 8).

The use of the recited cell separator permits (1) the substitution of the titanium or mild steel cathodes of the prior art chlorate cells with precious metal oxide coated cathodes or oxygen reduction (gas-diffusion) cathodes (specification, page 17, lines 11 - 14) and (2) the confinement of the hydrogen produced in the cathode compartment of the cell (specification, page 7, lines 2 - 6).

- It is noted that the recited "low alkali metal ion transport efficiency permselective polymer membrane" of Claim 8 defines over the permselective polymer membranes used in chlor-alkali cells, which have high alkali metal ion transport efficiency (Affidavit under Rule 1.132, page 2, third paragraph).

In another aspect (independent Claim 34) of the inventive electrochemical cell assembly for the production of an alkali metal chlorate, there is employed a

permselective polymer membrane separating the anode and cathode of the chlorate cell (specification, page 25, lines 10 - 12).



## **GROUND OF REJECTION TO BE REVIEWED ON APPEAL**

1. Whether Claims 8 - 17 are unpatentable under 35 U.S.C. 112, first paragraph as being based upon a non-enabling disclosure.
2. Whether Claim 34 is unpatentable under 35 U.S.C. 102(b) over Sawamoto et al.
3. Whether Claim 35 is unpatentable under 35 U.S.C. 103(a) over Sawamoto et al in view of de Nora et al.

## **ARGUMENT**

### **ISSUES FOR CONSIDERATION**

**I. Whether or not the invention of claims 8 - 17 is enabled under 35 U.S.C., first paragraph.**

**II. Whether or not the preamble recited in claim 34 should be given patentable weight. If so, is it a sufficient limitation, taken alone, so as to defeat the anticipation or obviousness rejections, respectively, of claims 34 and 35, in view of the references cited by the Examiner.**

## I.

### THE ENABLEMENT REJECTION

#### Claims 8 - 17 are rejected based upon a non-enabling disclosure

The Examiner has rejected claims 8 - 17 as non-enabled based upon the failure of working Examples 8, 9, and 10 to disclose the use of a cell membrane falling within the limits of the alkali metal ion transport efficiency of "less than about 60 %" (specification, page 13, line 14). It is considered that the Examiner has erroneously assumed that the scope of enablement of claim 8 must coincide with the particular alkali metal ion membrane transport efficiency limits set forth in the specification on page 13, lines, 14 - 16. In effect, the Examiner has, without basis, read into independent claim 8 the alkali metal ion transport efficiency limit of dependent claim 9. This is wrong. Surely, the Appellants have disclosed in working Examples 8, 9, and 10 basis for cell membranes within the broad terminology of claim 8. Examples 8, 9, and 10, disclose the use of a cell membrane having, respectively, 79 %, 77 % and 65 % alkali metal ion transport efficiency when used in the apparatus of the invention. As set forth in the Affidavit under rule 1.132 (page 2, last line), cell membranes useful in chlor-alkali electrolytic cells have high transport efficiency for alkali metal ions of the order of 92 - 96 %. The Appellants have provided basis in these Examples for use in claim 8 of the more broadly defined

recited limit "low alkali metal ion transport efficiency...membrane" in the assembly apparatus of the invention of claim 8 (from which claims 9 - 17 either directly depend or ultimately depend).

The Examiner has indicated in the Answer (in the paragraph spanning pages 3 and 4) that the scope of the disclosure of the cell membrane having an alkali metal ion transport efficiency of less than 60 % to less than 20 % is not enabled. The Examiner states that the scope of enablement, (namely, the upper limit of less than about 60 %, provided in the specification (on page 13, line 14) is insufficient under 35 U.S.C., first paragraph, for the claimed membrane. This is wrong. In accordance with MPEP 2164.08, (8th Edition, Revision No. 5, August 2006) the scope of enablement must only bear a reasonable correlation to the scope of the claims, as set forth in *In re Goffe*, 542 F2d 564, 567, 191 USPQ 429, 431 (CCPA 1976) in which the Court stated:

"[T]o provide effective incentives, the claims must adequately protect inventors. To demand that the first to disclose shall limit his claims to what he has found will work or to materials which meet the guidelines specified for "preferred" materials in a process such as the one herein involved would not serve the constitutional purpose of promoting progress in the useful arts."

It is acknowledged, as indicated in MPEP 2164.03, that the scope of the required enablement may vary inversely with the degree of predictability involved, but even in unpredictable arts, such as in the field of chemistry, a disclosure of every operable species is not required. Here, the Appellants are the first to disclose an

assembly, including an electrolytic cell, useful for the production of an alkali metal halate, which contains a low alkali metal ion transport efficiency cell separator. No prior art was cited by the Examiner to show such a cell separator in a chlorate electrolytic cell. The Appellants have disclosed a "Pioneer Invention" and, accordingly, the Appellants' claims must be broad enough to adequately protect the invention against those who come after and make improvements thereon in accordance with *Goffe*, cited above.

It is only reasonable that the upper limit of the Appellants' claimed invention not be limited to the low alkali metal ion transport efficiency (65 %) permselective polymer membrane disclosed in the Appellants' working Example 10 or to the upper limit transport efficiency of working Examples 8 and 9, respectively 79 % and 77 %, since to do so would leave the field open to others to seek protection for the use of similar membranes having lower alkali metal ion transport efficiency than the membranes disclosed in the Appellants' Examples 8, 9, and 10.

## **II.**

### **THE PRIOR ART REJECTION**

**Claim 35 is rejected as obvious**

Claim 35 has been rejected as obvious over Sawamoto et al. ('406) in view of de Nora et al ('979). Since neither of these references disclose or suggest an assembly for the production of an alkali metal halate, as recited in the preamble of independent claim 34, from which claim 35 depends, these references are not considered prior art. The preamble of claim 34 should be given patentable weight. This combination of references does not disclose an electrolytic cell for the production of an alkali metal halate. Accordingly, these references would not render obvious the assembly recited in the Appellants' claim 35. The scope limiting preamble of claim 34 and the clear reliance upon this claim preamble by the Appellants during the prosecution of the application transforms the preamble into a claim limitation (MPEP 2111.02 (II), last two paragraphs).

**Claim 34 is rejected as anticipated**

Claim 34 has been rejected as anticipated over Sawamoto et al. Since this reference does not disclose an assembly for the production of an alkali metal halate, this reference is not properly considered prior art and, therefore, would not anticipate claim 34.

Inspection of the entire record in this case reveals that an alkali metal halate electrolytic cell is, in fact, a structural limitation of the Appellants' claims. To begin with, the Appellants clearly intend to limit the scope of their claims to an electrolytic cell structure for the production of an alkali metal halate, as evidenced by the specification statement of the Field of the Invention and the Related Art and the

consistent reliance during prosecution upon the scope limiting effect of the preamble of claim 34. In the chlorate cells of the prior art, the anode and cathode are exposed to the same electrolyte, there being no cell separator of any kind. It is in the nature of a pioneer invention that the Appellants' claimed invention departs from the prior art chlorate cell by using a cell separator.

Generally, a preamble will be considered a limitation if the claim preamble recites essential structure or steps or if it is "necessary to give life, meaning, and vitality" to the claim (*Pitney Bowes*, 182 F. 3d at 1305). No litmus test defines when a preamble limits claim scope (*Corning Glass*, 868 F. 2d at 1257). However, certain guidelines (exceptions to the general rule as stated in MPEP 2114), indicating when a preamble will limit the scope of a claim, have emerged from various decisions of the Court of Appeals for the Federal Circuit (Fed. Cir.) See *In re Stencel*, 828 F. 2d 751, 754, 4 USPQ 2d 1071 (Fed. Cir. 1987) also cited in MPEP (8th Edition, Revision 5, August 2006) 2111.02, part II:

"[T]he framework - the teachings of the prior art - against which patentability is measured is not all drivers broadly, but drivers suitable for use in combination with this collar, for the claims are so limited."

To paraphrase the above as applicable here:

....the teachings of the prior art against which patentability is measured is not all electrochemical cells broadly, but cells suitable for use in producing chlorate, for the Appellants' claims are so limited.

(1) Jepson claiming generally indicates the intent to use the preamble to define the claimed invention, thereby limiting claim scope. See *Rowe*, 112 F. 3d at 479 (Fed. Cir. 1997) and *Epcon Gas Sys., Inc. v. Bauer Compressors, Inc.*, 279 F. 3d at 1022, 1029, 61 USPQ 2d 1470, 1475 (Fed. Cir. 2002).

(2) The dependence on a particular preamble phrase for antecedent basis may limit claim scope because it indicates a reliance on both the preamble and the body of the claim to define the claimed invention. See *Bell Communications Research, Inc. v. Vitalink Communications Corp.*, 55 F. 3d 615, 620, 34 USPQ 2d 1816, 1820 (Fed. Cir. 1995).

(3) When the claim drafter chooses to use both the preamble and the body of the claim to define the subject matter of the invention, the invention so defined, and not some other, is the one the patent protects." or when the preamble is essential to understand limitations or terms in the claim body, the preamble limits claim scope. See *Pitney Bowes*, 182 F. 3d at 1306.

(4) When the preamble recites additional structure or steps underscored as important by the specification, the preamble may operate as a claim limitation. See *Corning Glass*, 868 F.2d at 1257, USPQ 2d 1962, 1966 (Fed. Cir. 1989); *General Electric Co. v. Nintendo Co.*, 179 F. 3d 1350, 1361-62, 50 USPQ 2d 1910, 1918-19 (Fed. Cir. 1999); *Rowe*, 112 F. 3d at 479-80 (Fed. Cir. 1997); and *Applied Materials*, 98 F. 3d at 1573.



(5) When the applicant exhibits clear reliance on the preamble during prosecution to distinguish the claimed invention from the prior art this transforms the preamble into a claim limitation because such reliance indicates use of the preamble to define, in part, the claimed invention. See generally *Bristol-Myers Squibb Co. v. Ben Venue Labs., Inc.*, 246 F. 3d 1368, 1375, 58 USPQ 2d 1508, 1513 (Fed. Cir. 2001).

(6) A preamble may limit the claim when relied upon to distinguish a new use of a prior art apparatus or process. Without such reliance, however, a preamble generally is not limiting when the claim body describes a structurally complete invention such that deletion of the preamble phrase does not affect the structure or steps of the claimed invention. See *IMS Tech., Inc. v. Haas Automation, Inc.*, 206 F. 3d 1422, 1434, 54 USPQ 2d 1129, 1136-37 (Fed. Cir. 2000).

(7) Preamble language merely extolling benefits or features of the claimed invention does not limit the claim scope without clear reliance on those benefits or features as patentably significant. See *STX, LLC v. Brine, Inc.*, 211 F. 3d 588, 591 (Fed. Cir. 2000)

Here, the preamble is essential to point out that the assembly invention claimed is an improvement in electrolytic cells such that the production of an alkali metal chlorate can be performed therewith in a continuous, cyclic process. Clearly, the Appellants have chosen to rely upon the preamble of Claim 34 to distinguish the claimed invention over the references cited by the Examiner.

It is considered that while MPEP 2114 may state the general rule regarding scope limiting preambles in article claims, the exceptions to the general rule enumerated above in items (1) - (7), which are in accordance with MPEP 2111.02, part II, last two (recently added) paragraphs, are more appropriately applied to the preamble of claim 34. As stated with approval at the above MPEP citation, in *Catalina Mktg. Int'l v. Coolsavings.com, Inc.* 289 F.3d at 808-09, 62 USPQ2d at 1785:

"[C]lear reliance on the preamble during prosecution to distinguish the claimed invention from the prior art transforms the preamble into a claim limitation because such reliance indicates use of the preamble to define, in part, the claimed invention...Without such reliance, however, a preamble generally is not limiting when the claim body describes a structurally complete invention such that deletion of the preamble phrase does not affect the structure or steps of the claimed invention."

Accordingly,

(a) The Applicants' recitation of intended use of the assembly in a continuous, cyclic, electrolytic process in Claim 34 and the clear reliance of the Applicants upon this preamble during prosecution

(b) Distinguishes the claimed invention over the cited references by

(c) Transforming the preamble into a claim limitation because such reliance indicates use of the preamble to define, in part, the claimed invention.

In *Rowe v. Dror et al.* 112 F. 3d 473, 42 USPQ 2d 1550, (Fed. Cir. 1997) cited with approval in *Catalina Mktg. Int'l. v. Coolsavings.com, Inc.*, 289 F.3d at 8088-09, 62USPQ2d at 1785, referred to in MPEP, 2111,02, part II, the Court set forth guidelines for a determination of whether or not a preamble should be considered to define, in part, the claimed invention:

"The determination of whether preamble recitations are structural limitations or mere statements of purpose or use "can be resolved only on review of the entirety of the patent to gain an understanding of what the inventors actually invented and intended to encompass by the claim." *Corning Glass Works*, 868 F. 2d at 1257. The inquiry involves examination of the entire patent record to determine what invention the patentee intended to define and protect. See *Bell Communications*, 55 F. 3d at 621 (looking to patent specification to determine whether claimed invention includes preamble recitations); *In re Paulsen*, 30 F. 3d 1475, 1479, 31 U.S.P.Q. 2D (BNA) 1671, 1674 (Fed. Cir. 1994) (examining "patent as a whole"); *Vaupel Textilmaschinen KG v. Meccanica Euro Italia SPA*, 944 F. 2d 870, 880, 20 U.S.P.Q. 2D (BNA) 1045, 1053 (Fed. Cir. 1991) (looking to claims, specification, and drawings); *Gerber Garment Tech., Inc. v. Lectra Sys., Inc.*, 916 F. 2d 683, 689, 16 U.S.P.Q. 2D (BNA) 1436, 1441 (Fed. Cir. 1990) (noting that preamble recitations provided antecedent basis for terms used in body of claim); *Corning Glass Works*, 868 F. 2d at 1257 (considering the specification's statement of the problem with the prior art); *Kropa*, 187 F. 2d at 152 (noting that preamble sets out distinct relationship among remaining claim elements)."

## CONCLUSIONS

In conclusion, claim 34 is not anticipated by the reference cited and claim 35 is not rendered obvious by the references cited since none of the prior art relied upon by the Examiner relates to electrolytic cells for the production of alkali metal halates. The technology of chlor-alkali electrolytic cells is not pertinent to the electrolytic cells for the production of alkali metal halates. The prior art cells for the production of alkali metal halates have no cell separator. Unless a cell separator is employed in the alkali metal halate cells, the corrosive, aqueous sodium chlorate electrolyte would make impossible the use of (a) precious metal cathodes or (b) gas-diffusion cathodes and allow the resultant reduction in energy use and other advantages obtained with the inventive assembly including an electrolytic cell.

The invention of independent claim 8 and claims 9 - 17 dependent thereon has been disclosed in accordance with 35 U.S.C. 112, first paragraph, in accordance with working Examples 8, 9, and 10. There is no requirement in 35 U.S.C. 112 that all the Appellants' claims dependent upon claim 8 recite a specific range within the ranges disclosed in the working examples.

It is respectfully urged that reversal of the Examiner and the allowance of Claims 8 - 17 and 34 - 35 is in order.

December 12, 2006  
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## CLAIMS APPENDIX

8. An assembly for the continuous, cyclic production of an alkali metal halate comprising an electrolytic cell, a gas and liquid disengager for a catholyte stream, and a gas and liquid disengager for an anolyte stream, said electrolytic cell comprising a low alkali metal ion transport efficiency permselective polymer membrane separating an anode compartment and a cathode compartment, and a catalytic, metal anode and a catalytic metal cathode or a catalytic, metal anode and a gas-diffusion cathode.

9. The assembly of claim 8, wherein said permselective polymer membrane has less than about 60 % alkali metal ion transport efficiency.

10. The assembly of claim 9, wherein said permselective polymer membrane has less than about 50 % alkali metal ion transport efficiency.

11. The assembly of claim 10, wherein said permselective polymer membrane has less than about 20 % alkali metal ion transport efficiency.

12. The assembly of claim 9, wherein said catalytic, metal anode comprises a precious metal oxide deposited on a tantalum or titanium substrate.

13. The assembly of claim 12, wherein said catalytic, metal cathode comprises a precious metal oxide deposited on a nickel or titanium substrate.

14. The assembly of claim 9, wherein said cathode is a gas-diffusion cathode.

15. The assembly of claim 9, wherein said catalytic, metal cathode is selected from the group consisting of alloy mixtures of nickel-molybdenum, cobalt molybdenum, nickel-tungsten, cobalt-tungsten, nickel-iron, and nickel-cobalt on a nickel or steel substrate.

16. The assembly of claim 9, wherein said catalytic, metal cathode comprises an alloy coating of molybdenum, vanadium, and nickel on a copper substrate.

17. The assembly of claim 8, wherein said polymer membrane is characterized by less than about 20 % alkali metal ion transport efficiency, high hydrogen ion

transport efficiency, and cation exchange groups selected from the group consisting of carboxylic acid and sulfonic acid groups.

34. An assembly for the continuous, cyclic production of an alkali metal halate, comprising an electrolytic cell, a gas and liquid disengager for a catholyte stream, and a gas and liquid disengager for an anolyte stream, said electrolytic cell comprising a permselective polymer membrane separating an anode compartment and a cathode compartment, a catalytic, metal anode and a catalytic metal cathode or a catalytic, metal anode and a gas-diffusion cathode.

35. The assembly of claim 34, wherein said catalytic, metal anode comprises a precious metal oxide deposited on a tantalum or titanium substrate.

## **EVIDENCE APPENDIX**

**None.**



## **RELATED PROCEEDINGS APPENDIX**

None